

CLAIMS

What is claimed is:

1. A structure comprising:

a polycrystalline material comprising crystallites of polymers with interstitial regions therebetween;

Wherein said

polymers selected from the group consisting of a precursor to an electrically conductive polymer and an electrically conductive polymer;

said interstitial regions between said crystallites comprising amorphous material comprising an additive;

said additive provides mobility to said polymer to allow said polymer to associate with one another to achieve said crystallites.

2. A structure according to claim 1, wherein said structure is electrically conductive and has an isotropic electrical conductivity.

3. A structure according to claim 1, wherein said additive is ~~selected from the group consisting of plasticizers and diluents~~ *Plasticizer* *Plasticized*

4. A structure according to claim 1, wherein said additive is a plasticizer selected from the group consisting of:

Adipic acid derivatives

Azelaic acid derivatives

Benzoic acid derivatives

Citric acid derivatives

Dimer acid derivatives

Epoxy derivatives

Fumaric acid derivatives

Glycerol derivatives

Isobutyrate derivatives

Isophthalic acid derivatives

Lauric acid derivatives

Linoleic acid derivative

Maleic acid derivative

Mellitates

Myristic acid derivatives

Oleic acid derivatives

Palmitic acid derivatives

Paraffin derivatives

Phosphoric acid derivatives

Phthalic acid derivatives

Ricinoleic acid derivatives

Sebacic acid derivatives

Stearic acid derivatives

Succinic acid derivatives

Sulfonic acid derivative

Terpentines

Terpentine derivatives

Siloxanes

Polysiloxanes

Ethylene glycols

Polyethylene glycols

Polyesters

Sucrose derivatives

Tartaric acid derivative

Terephthalic acid derivative

Trimellitic acid derivatives

Glycol derivatives

Glycolates

Hydrocarbons

Phosphonic acid derivatives

Polysilanes

5. A structure according to claim 1, wherein said polymer is selected from the group consisting of substituted and unsubstituted polyparaphenylene vinylenes, polyparaphenylenes, polyanilines, polythiophenes, polyazines, polyfuranes, polypyrroles, polyselenophenes, poly-p-phenylene sulfides, polyacetylenes formed

from soluble precursors, combinations thereof and blends thereof with other polymers and copolymers of the monomers thereof.

6. A structure according to claim 1, wherein said structure has crystallinity greater than about 25%.

7. A structure comprising:

a polycrystalline material comprising crystallites of polymers with interstitial regions therebetween;

said polymer is selected from the group consisting of a precursors to an electrically conductive polymer and an electrically conductive polymer;

said interstitial regions comprise an amorphous material selected from the group consisting of said polymers;

said amorphous material includes an additive.

8. A structure according to claim 7, wherein said polymer is an electrically conductive polymer and said polycrystalline material has a conductivity which is isotropic.
9. A structure according to claim 7, wherein said polymer is selected from the group consisting of substituted and unsubstituted polyparaphenylene vinylenes, polythianophthenes, polyparaphenylenes, polyanilines, polythiophenes,

polyazines, polyfuranes, polypyrroles, polyselenophenes, poly-p-phenylene sulfides, polyacetylenes formed from soluble precursors, combinations thereof and blends thereof with other polymers and copolymers of the monomers thereof.

- a 10. A structure according to claim 7, wherein said ~~plasticizer~~^{additive} is selected from the group consisting of:

Adipic acid derivatives

Azelaic acid derivatives

Benzoic acid derivatives

Citric acid derivatives

Dimer acid derivatives

Epoxy derivatives

Fumaric acid derivatives

Glycerol derivatives

Isobutyrate derivatives

Isophthalic acid derivatives

Lauric acid derivatives

Linoleic acid derivative

Maleic acid derivative

Mellitates

Myristic acid derivatives

Oleic acid derivatives

Palmitic acid derivatives

Paraffin derivatives

Phosphoric acid derivatives

Sebacic acid derivatives

Stearic acid derivatives

Succinic acid derivatives

Sulfonic acid derivative

Terpentines

Terpentine derivatives

Siloxanes

Polysiloxanes

Ethylene glycols

Polyethylene glycols

Polyesters

Sucrose derivatives

Tartaric acid derivative

Terephthalic acid derivative

Trimellitic acid derivatives

Glycol derivatives

Glycolates

Hydrocarbons

Phosphonic acid derivatives

pub
Beate
Phthalic acid derivatives

Polysilanes

Ricinoleic acid derivatives

11. A structure comprising a polyaniline material having a plurality of crystal grains, said material having isotropic electrical conductivity.
12. A structure according to claim 1, wherein the amount of said additive is adjustable.
13. A structure according to claim 12, wherein said amount is controlled to modify physical properties of said structure.
14. A structure according to claim 13, wherein said physical properties are selected from the group consisting of glass transition temperature, compliance, thermal coefficient of expansion, modulus, yield and tensile strength, hardness, density.
15. A structure according to claim 1, wherein said crystallites have a size greater than about 80Å.
16. A structure according to claim 11, wherein said grains are greater than about 80 Å.
17. A structure according to claim 7, wherein said crystallites have a size greater than about 80Å.
18. A structure comprising:

a polycrystalline material comprising crystallites of polyaniline with interstitial regions therebetween;

said polyaniline is selected from the group consisting of a precursors to an electrically conductive polyaniline and an electrically conductive polyaniline;

said interstitial regions comprise an amorphous material selected from the group consisting of polyaniline;

said amorphous material includes an additive in an amount from about 0.001% to about 90% by weight;

said additive is selected from the group consisting of poly-co-dimethylaminopropyl siloxane, poly (ethylene glycol) tetrahydro furfurylo ether, glycerol triacetate and epoxidized soy bean oil.

19. A structure according to claim 1, wherein the amorphous material in the interstitial regions contains crosslinks.
20. A structure according to claim 1, wherein the amorphous material in the interstitial regions are deaggregated.
21. A structure according to claim 1, wherein the additive is removed.
22. A structure according to claim 1, wherein said structure is selected from the group consisting of an electrostatic discharge layer, is a wire, is a solder, is an

electromagnetic interference shield, is a semiconductor device, and a corrosion protection coating.

cr *pub 23* *B* A structure according to claim 1, wherein said amorphous regions have ^{*crystalline*} same order.

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